SUMMARY AND CONCLUSIONS

In addition to the FERC-certified route across Haverstraw Bay, a total of 15 different alternative routes containing 23 separate segments in Rockland and Westchester counties were reviewed. Each of these routes was evaluated on a stand-alone basis, as a pipeline is a continuous structural conduit, and each of its segments must be feasible in order for the route as a whole to be viable. Baker staff, familiar with the permitting, design and construction of linear utilities such as high pressure, large diameter gas transmission pipelines, reviewed aerial photography and topographic maps and made several detailed on-site field reviews of all the separate routes and their respective segments. Each route and segment has an individual analysis and discussion within this report. The individual cost to construct each of these routes was not specifically addressed; however, the various constraints identified would certainly increase the construction cost, conceivably to the point where it would be uneconomical to build. Other constraints such as those that affect the environment, topography, and type of development, inhabited areas, and constructability were noted. Upon completion of this analysis, none of the alternative routes was found to be feasible from a design, construction, operation and maintenance perspective.

Almost all the alternatives suffer from the same feasibility constraints of not having sufficient workspace to construct, operate and maintain the pipeline facilities. Adequate workspace is necessary for the pipeline construction spread, which operates as a moving assembly line performing specialized procedures in an efficient, planned sequence. Twenty-four inch pipeline construction requires a construction work area that is approximately 75 feet wide if the area is relatively flat. It is essential that equipment be able to work side by side with adequate space for passing and efficient construction of the facilities. Certain field conditions may permit short sections of the pipeline to be installed in narrower workspace, but an adequate staging area and suitable access would still be required in the vicinity. Further, the use of short (20-foot) lengths of pipe for construction is not feasible for a number of reasons as follows:

1. Twenty-four-inch diameter pipe is not normally available in such short lengths.
2. Short lengths would prevent proper bending of the pipe (required to fit the trench) since US DOT code does not allow bends to occur near the welds.
3. The shorter pipe joints would result in numerous additional field welds and thus significantly increase the overall construction duration and cost to install the pipeline.

Regardless, the assumption that the use of shorter joints would somehow reduce the workspace requirements for this segment is also incorrect. The size of the workspace is dictated, among other things, by the weight of the pipe string once it is welded together and consequently, the size of the equipment needed to safely lift and place it in the trench. A 50-foot permanent ROW to permit safe pipeline operation and maintenance is required regardless of the area used for construction.

Six of the routes would cross the Hudson River in the same area as the existing Tennessee Gas Pipeline ROW and land on the eastern shore in a small community in the Village of Dobbs Ferry. From there, they all follow the Tennessee ROW until its intersection with the FERC-certified Millennium route near the Sawmill Parkway. These 6 routes are infeasible from a design and construction perspective as they all contain the following fatal flaws:

- No workspace exists to land the pipeline on the eastern shore.
- Tennessee's facilities occupy all the existing usable workspace and ROW for at least 500 feet along Wickers Creek.
- Inadequate workspace and no available ROW exist within "The Landing" for at least 1,000 feet due to severe encroachments to Tennessee's ROW from condominiums.
- Inadequate workspace and no available ROW exist at multiple locations within the upscale residential community of "Legend Hollow".

It should also be noted that each of these 6 routes would cross through the Piermont Marsh, an ecologically sensitive area that is designated as a Significant Coastal Fish and Wildlife Habitat, the same designation as Haverstraw Bay. Unlike Haverstraw Bay, the Piermont Marsh has additional significance due to the fact that the Piermont Marsh is designated as one of only 25 estuarine research sites under the National Estuarine Research Reserve System by the National Oceanic and Atmospheric Administration. Further, each route would require permanent removal (via blasting) of approximately 3,700 cubic yards of rock that is currently part of the scenic cliffs of the Palisades. Some of the alternative segments leading to the river crossing location would virtually clear-cut several miles of the eastern side of the Palisades Interstate Parkway (PIP), a National Historic Landmark, of its mature forests, degrading the PIP's visual aesthetics and exposing hundreds of private residences (which are located immediately adjacent to the PIP ROW) to the visual and noise impacts associated with the PIP.

Two other routes would cross the Hudson River near Nyack Beach State Park and would land in the vicinity of Route 117 on the eastern shore. None of the segments that comprise these routes is feasible, primarily due to inadequate workspace and/or ROW to install and operate the facilities. Further, Nyack Beach State Park, also a National Natural Landmark, would be closed for at least several months to complete the required pipeline construction activities in this area. The historic access roads, with hand-laid, vertical stone walls and the seawall along the Hudson River, would most certainly be severely damaged or destroyed by construction equipment.

Another proposed alternative would cross the Hudson River near Nyack Beach State Park and would follow the river's navigation channel for several miles. This route would significantly increase the length, time and construction-related impacts to Haverstraw Bay. Further, construction could not be completed within the narrow construction window that has been imposed, and it is extremely doubtful that the US Army Corps of Engineers would permit joint occupation of the Federal navigation channel for this extended length.

The remaining six routes cross the Hudson River in the same vicinity near Algonquin's pipelines and the Lovett Power Plant. From there, they all follow electric transmission ROW's and ultimately cross NY State Route 9. The NY State Route 9 crossing is not feasible due to extensive rock walls close to the highway, which prevent adequate room to bore the highway. In addition, the alternative routes leading to the Hudson River each contain multiple fatal flaws, primarily inadequate workspace to construct, operate and maintain the pipeline facilities as follows:

- Inadequate workspace and no available ROW exist within several upscale residential communities for over a mile due to severe encroachments to Algonquin's and/or Orange & Rockland's ROWs from residences.
- Inadequate workspace and no available ROW exist at the Algonquin ROW on the east side of the Hudson River.
- Inadequate workspace and no available ROW exist along much of Orange & Rockland's electric transmission ROW from residences that encroach upon the ROW.

Impacts to historic sites along some of these routes would also be significant and permanent. Two of these routes traverse miles of either Harriman State Park (National Register of Historic Places) or the PIP (National Historic Landmark). The necessary grading, blasting, and mature forest removal would permanently alter these parks. Another of these routes would cross Stony Point Battlefield (National Historic Landmark) near the park entrance and stone archway. The rock cut through this area is very narrow and would have to be widened by at least 50 feet. This would permanently destroy the character of this entranceway, and the historic bridge would be permanently removed in this process. There are multiple other locations where construction along the railroad ROW is not feasible due to steep grades, existing utility structures, and nearby residences and businesses.

The FERC certificated route crosses the Hudson River at Haverstraw Bay. This crossing site was dictated by the location on the western shore of the Hudson River of the existing pipeline to be incorporated into the Millennium Project and site-specific environmental considerations regarding feasible Hudson River crossing locations. Specifically:

- In Rockland County, the project will incorporate an existing pipeline from the western shore of the Hudson River at the Bowline Generating Station to a point approximately 10.9 miles west of that location.

- The Bowline Station property contains an ideal staging area for a crossing of the river.

- The proposed landfall on the eastern shore of the Hudson River provides a suitable construction staging area while avoiding populated areas.

A number of construction methods, including HDD have been studied to determine their efficiency, effectiveness and feasibility for crossing this area. After careful study, Millennium proposed the lay-barge method, which among other beneficial aspects will restrict construction activities to a relatively short area. This method also permits the spoil to be temporarily stored in barges for later use during backfilling and thus minimizes turbidity in the water column. For a HDD crossing to be successful, the crossing length, topography, soil composition, and physical space for staging must all be evaluated. If any component is inadequate, an HDD crossing will likely fail. In this instance, the lengthy staging area necessary to fabricate the pipe string is not available, and the crossing length is at least an order of magnitude longer than any direction drilling firm has ever accomplished with 24-inch pipe. It is important to note that even Cherrington (the direction drill contractor retained by O'Brien & Gere) admits "that a project of this magnitude is completely outside the realm of conventional HDD technology..." and that it's Environmental Beneficial Boring (EBB) technology "...has had limited opportunities for use therefore placing it in the realm of research and development also." This is hardly the basis for a sound construction plan and Haverstraw Bay is far too sensitive an area to even attempt using

river crossing technologies which are in the "realm of research and development." Given that these drilling methods are not within the realm of proven technology, further investigation of them for this crossing location is not warranted.

It is our opinion that none of the alternative routes, or any other combination of the individual alternative route segments, is feasible from a design, construction, operation and maintenance perspective. In contrast, the FERC-certified route, with proper mitigation, can be constructed, operated and maintained in a safe and responsible manner.

The Village of Croton-on-Hudson claims that Millennium's proposed Wellfield crossing will:

- negatively impact Wellfield yield during trench dewatering;
- release contaminates during construction and impairment the aquifer;
- require blasting and thus damage the Wellfield;
- reduce Wellfield expansion options due to ROW restrictions; and,
- contaminate the Wellfield with odorants and pipeline fluids during pipeline operation.

However, based on our involvement in the routing of this portion of the pipeline and review of the extensive construction and mitigation information filed by Millennium, it is apparent that none of the impacts are of serious consequence.

Dewatering the trench will not result in a decline in the local water table since the water would normally be discharged immediately adjacent to the construction work area and be available to recharge the aquifer. This task will be completed in a couple days at most. However, in addition to the extensive mitigation already proposed, using a concrete coated pipe across the Wellfield will increase the mechanical protection on the pipe and eliminate the need to de-water the trench altogether.

The risk for contaminate release into the Wellfield is also insignificant. A comprehensive SPCC plan will be closely followed during construction and no materials are proposed to be stored in the area which could impact either the Wellfield or the aquifer.

Geotechnical data for the valley show that bedrock is over 68 feet deep. Thus, blasting within the Wellfield is not required and none of the cited the potential impacts will occur.

The route across the Wellfield was selected with assistance from a landowner whose land would be traversed, and with the Village of Croton-on-Hudson Engineer who, in effect, chose the alignment through the Village's water Wellfield. This alignment avoided all existing wells (active and inactive) and sites for future wells. Given the highly permeable nature of the aquifer, Millennium's commitment to bury the pipeline a minimum of eight feet deep (to prevent possible interference with the Village's water lines), and the lack of any other limitation on locating a new well (other than within 25 feet of the proposed pipeline), virtually the entire Wellfield is available for future development.

The chance that the pipeline would leak and introduce contaminants into the Wellfield is extremely remote. The completed pipeline is thoroughly tested before it is placed into service and will be continuously monitored to detect leaks. The odorants added to the natural gas are not

soluble in water, and do not leak out of the pipeline as a liquid. Odorant is a vapor in the gas stream and will dissipate into the atmosphere should a leak occur, not into the ground or in groundwater. It is highly also unlikely that any other fluids would be in the gas stream since only dry, high quality natural gas would be contained in the pipeline once it is placed in service.

Finally, the suggested alternatives that would avoid the Wellfield are not reasonable from a construction or design perspective. The "Northeast Alternative" would require side slope construction through a steep area that has several slips and two additional crossings under Con Ed's powerline facilities. These slips could easily compromise the integrity of the pipeline during operation and place not only Millennium's facilities in jeopardy but Con Ed's as well. The "Southwest Alternative" would place the pipeline in multiple local roads which are narrow and winding. Even with the use of manufactured bends, it is doubtful that the pipeline would fit into this narrow corridor. Construction would require closure of these local roads for weeks if not months and suitable detours are not available.

Millennium has incorporated numerous design and construction features to minimize impacts within the Arboretum. These plans include the use of sack breakers, devices that are specifically designed to prevent the trench from acting like a conduit. Thus, existing subsurface water patterns are maintained. Other standards specifically require restoration of original wetland and drainage pattern contours, thus surface drainage will be equally unaffected. As a result of these site-specific mitigation measures, there will be no short or long-term affects on surface or ground waters. An HDD installation in this location is not recommended. It is not apparent that sufficient workspace is available outside the Arboretum. Additionally, due to the depth of the installation, the cathodic protection and voltage mitigation effectiveness cannot be routinely confirmed. An HDD installation near Con Ed's power lines (the integrity of which have been the subject of great concern from the New York Public Service Commission and Con Ed) is not in the best interests of either facility.

Catskill Aqueduct/Bryn Mawr Siphon

The NYSDOS requested Millennium to consider an alternate route at the Catskill Aqueduct Bryn Mawr Siphon. This suggested route is not feasible as it contains numerous fatal flaws described below.

The west side (cut side) of the Thruway at the crossing location has a rock cliff immediately adjacent to the roadway. The east side (fill side) has a steep incline consisting of fill material and supports the Thruway surface. This area is also on a substantial curve in the Thruway. In order to stay as far away from the Aqueduct valve chamber (located immediately to the east of the Thruway) as possible, the pipeline would have to be installed along the western edge of the Thruway. This would result in a bore well over 600 feet in length, far beyond the typical maximum bore length of 250 feet. Regardless of the bore length, the proximity of the rock cliff prevents creation of a receiving pit, thus a bore is infeasible. Further complicating this crossing site is the location of an apartment complex and Con Ed's electrical facilities, in particular the towers supporting six of the main electrical circuits providing power to New York City. As a consequence, the pipe cannot be adequately bent, even with the use of manufactured bends, to reconnect with the certificated route. Other pipe installation methods were also considered but the available workspace prevents their use.